



**APPLICATION
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TITLE: ~~A METHOD FOR INCREASING SYSTEM RESOURCES
AVAILABLE TO A USER~~

APPLICANT: ROBERT MECHALEY, RICHARD A. MINER

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Lisa G. Gray
Lisa G. Gray

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~~A METHOD FOR INCREASING SYSTEM RESOURCES AVAILABLE TO A USER~~

Background of the Invention

5 The present invention relates to a computer-implemented method and apparatus for managing available resources, and more particularly, to a method and apparatus for brokering available resources and services.

10 Today there are many different commercially available devices that enable people to communicate with each other electronically. In addition to the ubiquitous telephone that has been around for decades, there now are cordless phones for the home, mobile phones for the car, handheld wireless phones which fit into a person's jacket
15 pocket, pagers, local and wide area computer networks, and facsimile machines, to name a few. Undoubtedly, the number and type of devices and their sophistication will continue to increase over time. Indeed, it is likely that a day will soon arrive when it will be possible for everybody to
20 conveniently and inexpensively be within arms reach of some communication device that enables them to communicate with other people.

25 The proliferation of different types of communication devices and the increasing diversity of communications media present new challenges. How will communications among the different devices and over the different communications media be coordinated and managed so that people have truly effective and useful access to each other? One challenge is associated with communicating
30 information between and across different communications media. Another challenge is related to handling the inevitable increase in the number of calls so as to maintain accessibility of users. For example, as more people come to rely on their wireless phones to transact business while on
35 the road or away from their offices, their phones are likely

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to be busy a larger percentage of the time. As a consequence, although a wireless phone can go anywhere with its owner, to the people trying to reach that owner when the phone is in use, the owner will still seem to be as
5 inaccessible as when he did not carry a wireless phone. In addition, the more the owner of such a device uses it, the more likely it will be that he will not know that somebody else was trying to reach him and thus he may miss important calls.

10 Thus, an obvious advantage of many of the new commercially available communications devices is that they offer the possibility of greater mobility to the user. Unfortunately, however, it is not always having to be near the office telephone that ties a business person to the
15 office. The office provides other services that are also important and may not be so mobile. Thus, to fully realize the greater mobility that is offered by the new communications devices and media, these new technologies must be provided in a way that takes into account the
20 business person's dependance on other services besides communications.

In addition to the many various technologies and options which will be available to the user, there will also be costs involved for each of these technologies. A user
25 may not want to pay for all of the technology available to him. At the same time, the vendor of the technology will try to and, in fact will, build into his equipment as many functions and needed technologies as possible. As a result there is a constant tension between the vendor or salesman
30 trying to sell as many services and options as possible and the user who is limited, substantially, in what he may either want, or think he wants, and can afford.

statistical data, in the illustrated environment of an electronic assistant, such as that described in U.S. Patent Application Serial No. 08/316,635, filed September 30, 1994, ^{now U.S. Patent 5,652,789} and entitled "A Network Based Knowledgeable Assistant," the

5 contents of which ~~are attached hereto as Exhibit A and~~ are incorporated herein, in their entirety, by reference, include identifying when the user has sufficient mastery of different functions, (for example, when certain telephone numbers are called or received a certain minimum number of
10 times in a week), and/or determining when various functions are used in a meaningful way.

In another aspect of this invention, the method relates to brokering upgraded functionality in a voice responsive telephone personal assistant system for enabling
15 greater functionality for a product function in the system. The method features the steps of collecting use data describing use of the product functions, analyzing the data to determine whether at least one use threshold has been exceeded, and communicating to the user of the personal
20 assistant system an availability of the greater functionality for the system when at least one use threshold has been exceeded.

The invention further relates to a system for brokering upgraded resources for enabling a greater
25 functionality for a product function. The system, implemented preferably in a programmed computer, includes software for effecting the steps of collecting data describing user interaction with the product function, analyzing the data to determine whether at least one data
30 pattern can be identified, and communicating to a user of the product function, when at least one data pattern has been identified, an availability of the greater functionality. Among the operations effected by the

computer software operating in the computer system are collecting interval of use data for the product and/or collecting statistical data regarding use of the product.

Brief Description of the Drawings

5 Other advantages and features of the invention will become apparent from the following description of a preferred illustrated embodiment, taken together with the drawings in which:

10 Fig. 1 shows the electronic assistant and office items;

Fig. 2 shows a first hardware configuration;

Fig. 3 shows a second configuration for the system architecture; and

15 Fig. 4 is a process view of the software architecture.

Description of the Preferred Embodiments

Referring to Fig. 1, the invention is described in the context of an electronic assistant which such as described in U.S. Patent Application Serial Number
20 08/316,635, noted above. The invention, however, is applicable in many other fields and with many other products or product functionalities where a selling up, or upgrading process, can be advantageously employed. Thus, referring to Figure 2, in a most general case, a system according to the
25 invention can have a central processor 100 which connects to a local area network 110 over a plurality of input/output lines 120. Also connected to the local area network 110 are a plurality of user modules 130. This structure can be used for example, where the user modules are telephone
30 connections, where local area network is a telephone network and the lines 120 are connections from the telephone network to the central processor. In the instance of the electronic assistant described in connection with U.S. Patent Serial

No. 08/316,635, the central processor provides a number of different functionalities, available to the users through the modules 130. A plurality of user connections can be active at any time as evidenced by the plurality of
5 connecting lines 120.

In a alternate structure, referring to Figure 3, the central processor acts as a central server 200 which connects over either a network, which can be a telephone network, a cable network, a local area network, etc. to a
10 plurality of so-called thin network computers 210 or the equivalent. In this configuration, the applications are stored at the server and the network computers 210 operate upon the application provided by the server. Other configurations will be apparent to those practiced in this
15 field and the invention is not limited to the particular configurations illustrated in Figures 2 and 3.

Referring then to Figure 1, in the context of an electronic assistant, the equipment introduces many new concepts to the typical user or subscriber, using what can
20 best be described as a "virtual office", as a model. The assistant 10 works in an office containing the subscribers' objects, which are called "items". An item is a piece of information that the electronic assistant stores in a database and works on for the subscriber. The subscriber
25 can use spoken or touch-tone commands to have the electronic assistant work on various items and the electronic assistant then uses a dialog to gather the information it needs from the subscriber to complete one or more tasks. Since many systems, such as the electronic assistant noted above, can
30 have many features, it is not uncommon for a vendor to price the product according to the functionality which has been purchased. In the electronic assistant identified in U.S. Patent Application 08/316,635, the various items can include

any of the following: a schedule 12, a message 14, a contact 16, (for example, a person 18, a group 20, or a place 22), a reminder 24, a phone book 26, or trash 28. Messages also include other items such a contact, a
5 reminder, or a page, etc. Messages can also be multimedia or include any sort of composite information.

From the vendor's prospective, it is desirable to sell to the subscriber as "fully loaded" a product, with as much functionality, as possible. In this manner, the
10 subscriber can have a fully functional product, at a cost, and the vendor is able to obtain the greatest price since the product functionality is the highest. Often, however, the subscriber is neither willing nor able to pay the cost of a fully functional system, or may not want, or believe
15 that he does not want, all of the functionality which the vendor can provide. There thus exists an inherent conflict between the subscriber and the vendor which ultimately can result in either no sale or the sale of a very limited product with little likelihood of further enhancements
20 without substantial sales force involvement.

In accordance with one aspect of the invention, however, there is included, in the delivered product, a brokering system which automatically makes available to the user or subscriber, upon specified circumstances and costs,
25 functionality beyond that which he had purchased. That functionality can in some instances be built into the system as originally delivered, but not yet made available to the user or subscriber until he has purchased it, or it can be, for example, functionality such as a user software and/or
30 hardware upgrade, which includes additional functions beyond those originally purchased by the user or subscriber. The brokering system included in the product originally provided to the user or subscriber, in any circumstance in accordance

with the invention, has the ability to automatically monitor various data, such as the use of the product by the user, and thereby make decisions with regard to when to offer to the user the additional functionality, and the type of
5 functionality to be offered.

In accordance with another aspect of the inventive structure, as noted above, the brokering system can be a server based centralized system having full functionality while the network computers connected to it have different
10 or varying functionality. In such a system, the brokering system is included in the centralized server and, depending upon various data which it monitors or seeks, such as the use of the server by the user, it makes decisions with regard to when and how to offer to the user any additional
15 functionality, and the type of functionality to be offered. In this instance, therefore, the monitoring system is not built into the user purchased portion of the system but is available at a central site, server 200, along with, in typical instances, the full functionality which will be
20 offered. In other aspects of the invention, the central site may not have the full functionality and the operator of the central site may be required to purchase additional functionality once the demand for that functionality becomes apparent.

Thus, in the context of the electronic assistant described in U.S. Application, Serial Number 08/316,635, a delivered system can contain many features and functions. These include a high level function for call answering and voice messaging between groups, single number or call
25 routing, basic scheduling and reminders, voice dialing phone numbers, voice dialing contacts, group features, unified mailbox, etc. While these features work well as a complete
30

package, many of them can stand alone as individual services, or work as combined sets of features.

There are two drawbacks of grouping the features together. One is complexity for the end user and the other is cost. The invention discloses a method for providing users of a large application with a mechanism to start off with a seemingly much smaller feature set and which, thereafter, can have additional features sold to the user or subscriber (and added to the service) over time. As described in more detail below, the system itself monitors the user's usage and other data and offers or sells the additional services or functionality automatically.

As suggested above, grouping all the features together causes the application to be very large and therefor difficult to learn by the end user. Placing all of the features in the initial product offering results in the user or subscriber having to pay for all of the resource requirements, development and support of the complete application (even though the subscriber may only use a smaller subset). This would be similar to requiring someone, who is just starting out with a new computer, to pay for an entire Office Professional Suite. If the user could start out with a simple word processor, and if the system could determine that he has learned the features of the processor, and is familiar "enough" with the product, then the system can suggest that he try a full-featured word producer. The system could automatically upgrade (for example, on-line and if desirable, on a trial basis), deliver a quick on-line tutorial and bill them for the new features. Then after a (short) time interval, the system could offer the user a spelling and grammar checking module, then a minimal spread sheet, a scheduler, etc. This can continue until the user has acquired the entire

functionality of the Office Professional Suite. The user builds up functionality at his own pace and can decide whether or not to add a database and presentation package to the bundle. That is, depending upon need and price, various
5 upgrades can be purchased.

Thus, users or subscribers start with a set of basic services. As they use those services, the system automatically evaluates individual usage patterns, demographics, and other data, and offers additional services
10 that fit the user's work style. Since subscribers or users acquire new services at their own pace, they feel in control: choosing only the features that they value, and mastering each new set of services before adding new ones.

While described in terms of an electronic assistant,
15 the invention is equally applicable to other product functions and system structures, which can be upgraded in a continuous and rational manner. For purposes of the description which follows, however, the use of the electronic assistant shall be continued, in detail.

20 The basic functional elements, according to the illustrated electronic assistant embodiment of the invention are:

1. An Entry Level Service (ELS) - In the case of
25 the electronic assistant, this can be a package of functionality such as voice messaging or voice dialing. The user or subscriber starts with the basic functionality in these packages. In the case of voicemail, the user can, for example, retrieve, review and call back people
30 who have left messages. In the case of voice dialing, the user can have the capability to create and dial contacts.

2. Sell up modules - These are modules of new capabilities which can be plugged into the ELS's. For instance, the ability to receive a call while the user is listening to messages, the ability for the user to create voice notes which are stored with his messages, the ability to set reminders, etc. Further, some ELS's themselves might be sell up modules for other ELS's. For instance, voice dialing (which is itself an ELS) might be a sell up module for voicemail.

3. Usage Data - The illustrated system accumulates data from the operation of the system and the user's relative activity, a user's account, or groups of users' or user's accounts. For instance, if a user is using the voicemail ELS (VM-ELS), the system can also keep track of each caller who calls him, the caller's phone number, how the caller says his name, etc. The system might also keep track of the fact that the user calls back some of these callers frequently while others are not called back. Other types of data that might be collected include:

- how many times a user has used a particular feature (for example, to determine whether the user has exercised enough system functionality and is ready to learn more);
- who calls the user; how often does the system determine a particular person has called (for example, to determine how and

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when to sell up the contacts and voice dialing functionalities);

- what time of day is the account used most often (for example, to enable the system to offer to call the user at that time of day each day);
- how often does the user turn on and off their mobile phone (for example, to decide that the subscriber needs a follow-me service).

4. Sell up Rules - Sell up rules are associated with sell up modules and define when the sell up modules are triggered by the Usage Data. For example, there can be a set of rules to define how/when to sell up from the VM-ELS to VM-ELS + Contact/Voice-dialing SUM (CVD-SUM). The rule can be, for example:
If: (the user has used VM-ELS for at least 2 months) AND
((the user has received frequent calls for at least two months) AND
(the user has used the call-phone number command twice per day for at least five days))
Then Sell up CVD-SUM
5. Automated Marketing Manager Module - This is the module which analyzes the rules and makes the decision to suggest the sell up. It can evaluate straight rules; and/or it can use fuzzy logic to help it make decisions. It can tune or adapt itself, (the rules and the "fuzzy-ness") based on history. (This typically requires that the module collect data from many users as described in more detail

below.) For instance, there should be a feedback loop identifying if the sell up was successful so that the module can tune or adapt itself based on a longer history of users. The data that is collected from multiple systems should be able to be used and analyzed (for example, in an automated way) so that the module can become "smarter" (that is, trained) over time and can have greater success when it offers a sell up.

Referring to Fig. 4, in accordance with the invention, the system at 300 monitors various of the features and functions described above. If it determines any threshold is exceeded, at 302, the system, at 304, determines whether, according to its rules, a sell up should be offered to the user. If no sell up is to be offered, the system returns to its monitoring mode at 300. If a sell up procedure is to be offered, the added functionality is made available to the user, at 306, depending upon the use pattern or data which initiated the sell up. The user accepts or declines the added functionality, at 308; and if accepted, the added functionality is made available to the user on the offered terms at 310. Control then returns to step 300.

As the system, whether it be the configuration of the control processor 100 (Fig. 2) or central server 200 (Fig. 3) monitors the features and functions of the system, it compares its collected data against predetermined, or "fuzzy", thresholds according to the illustrated embodiment of the invention. The data which it monitors can include solely use data as described above, or, it can also include demographic or geographic data and other information provided by the user, to enable the system to make a more

intelligent decision regarding sell up. Thus, if the user is located in the Northeastern part of the United States, and it is winter, the system may offer the user access to additional databases, for example, for use in skiing. In another situation, if the system knows that the user is an attorney, and the user has had sufficient use of the system, the system can offer the user access to a lawyer's database and the functionality associated therewith.

Thus, once a threshold has been exceeded, that is, once a data pattern has been identified, (and typically a threshold or data pattern is dependent upon one or more monitored parameters or pieces of information), the system makes the decision whether the sell up should be offered, as indicated at 304. The decision can be made, for example, by rule, that is, if the threshold is exceeded, a sell up should be offered. On the other hand, if the system is adaptive, it can determine whether offering a particular sell up to other users under the same conditions was successful. If the success rate is minimal, then the system can decide that the sell up should not be offered. Thus, the system has the capability of gathering data from a plurality of users and operating upon that data to determine whether the sell up should be offered. The data, in the case of the system illustrated in Figure 2, may be stored individually at the user locations 130 in which case the system will need to acquire that data; and in the case of, for example, the system of Figure 3, the data can be stored centrally. In either instance, the brokering process operates upon the data in the same manner.

As noted at step 306, the additional functionality is offered to the user once the decision is made to offer the sell up. In accordance with the illustrated electronic assistant embodiment of the invention, the offer can be made

